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Low-Cost Mission Operations
by
Gael F. Squibb, Manager
Mission Operations Development Program Office
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, CA 91109-8001 818.354-4086

and

Kurt Heftman, Consultant
5000 East Bonanza Road, Suite 337
Las Vegas, NV 89110 702.459-2914

Planetary and interplanetary spacecraft of the next century will require methods of flight and mission operations quite different from those in use today. Since the late 1950s, lunar, planetary, and interplanetary spacecraft carried the maximum load of science and engineering systems the launch vehicle was able to lift, including the shuttle. The state-of-the-art onboard data systems required frequent, if not continuous, tracking and data acquisition as well as commanding, via large ground antennas. Large teams were needed to monitor and control these spacecraft and to design optimal sequences for science data acquisition.

The New Millennium spacecraft series will be smaller and more easily launched. They will have only a few focused science sensors. Onboard housekeeping, data acquisition, storage, downlink, and onboard navigation capability will be quite intelligent. This will require only periodic contact signaling with large multi mission ground antennas and control centers. Data packages will then be routed to investigators. Return commands will be integrated into sequences and uplinked for appropriate execution.

This paper will discuss the transition toward smaller, faster, and cheaper mission operations, and the steps necessary to get from here to there.